

## The Nearctic Species of *Deuterixys* Mason (Hymenoptera: Braconidae)

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*Abstract.*—The three Nearctic species of the genus *Deuterixys* are described and keyed for the first time: *D. quercicola* Whitfield, *D. pacifica* Whitfield and *D. bennetti* Whitfield. Comparisons are made to the described Palearctic species.

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The genus *Deuterixys* was proposed by Mason (1981) to include the members of Nixon's (1965, 1976) carbonarius-group of *Apanteles* Foerster: *A. carbonarius* (Wesm.), *A. rimulosus* Niez., *A. nixoni* Papp and *A. patro* Nixon, all Old World species. Below I describe and key three new species from North America, all reared from *Bucculatrix* spp. (Lepidoptera: Lyonetiidae).

### MATERIALS AND METHODS

The 149 examined specimens came from the collections mentioned in the acknowledgments and from my own collection. All measurements were made to the nearest 0.1 mm at 50× or 100× using a Leitz dissecting microscope with an ocular micrometer. The wing figures were prepared from slide-mounted material using a microprojector. Morphological terminology follows that of Mason (1981).

### *Deuterixys* Mason, 1981

A detailed generic description is provided by Mason (1981). The genus can be distinguished from other Microgastrinae by the following combination of features: vein r-m<sub>2</sub> of fore wing (2r-m of Mason, 1981) absent; propodeum polished and bearing a strong longitudinal medial carina; tergite I of metasoma with mediobasal longitudinal groove; tergites II and III broad, subrectangular and usually densely sculptured; ovipositor sheaths short, decurved, subexserted. In addition, the species treated here share the following characteristics which may not be universal within the genus: metanotum sublaterally withdrawn from scutellum, exposing mesothoracic postphragma; sublateral setiferous lobes small but projecting anteriorly to near scutellum; tibiae of metathoracic legs with 10–12 spines on outer face; tergite II of metasoma with a more or less distinct raised medial section.

As far as is known, all *Deuterixys* species parasitize the larvae of *Bucculatrix* spp. and are unusual among Microgastrinae in emerging as adults from the host cocoon. In addition to the described Old World and the new Nearctic species discussed here, I have seen several undescribed species from Central and South America.

*Deuterixys quercicola* Whitfield, NEW SPECIES

(Figs. 1, 4)

*Holotype female*.—Overall length 1.8 mm; fore wing length 1.9 mm.

Head: Antennae slightly longer than body, entirely dark; apical 9 flagellomeres with only one rank of placodes; 2nd flagellomere  $3.0\times$  longer than broad, 14th flagellomere  $1.4\times$  longer than broad. Frons  $1.4\times$  broader at midheight than midlength; inner margins of eyes converging towards clypeus. Punctuation of head indistinct.

Mesosoma: Mesoscutum black, weakly punctate anteriorly, becoming nearly smooth and polished posteriorly. Scutellar disc mostly nearly impunctate with weak punctuation appearing peripherally. Propodeum highly polished, virtually unsculptured except for strong medial longitudinal carina and weak transverse sculpturing near spiracles and along anterior third of medial carina; declivous over most of length.

Legs: Prothoracic legs fulvous except darker brown coxal bases, femoral bases and apical tarsomeres. Mesothoracic legs dark brown proximally except yellowish distal trochanters; femoral apices, tibiae and tarsi fulvous. Metathoracic legs dark brown except in vicinity of trochanters and bases of hind tibiae (here fulvous). Hind apical tibial spurs short, whitish, subequal in length.

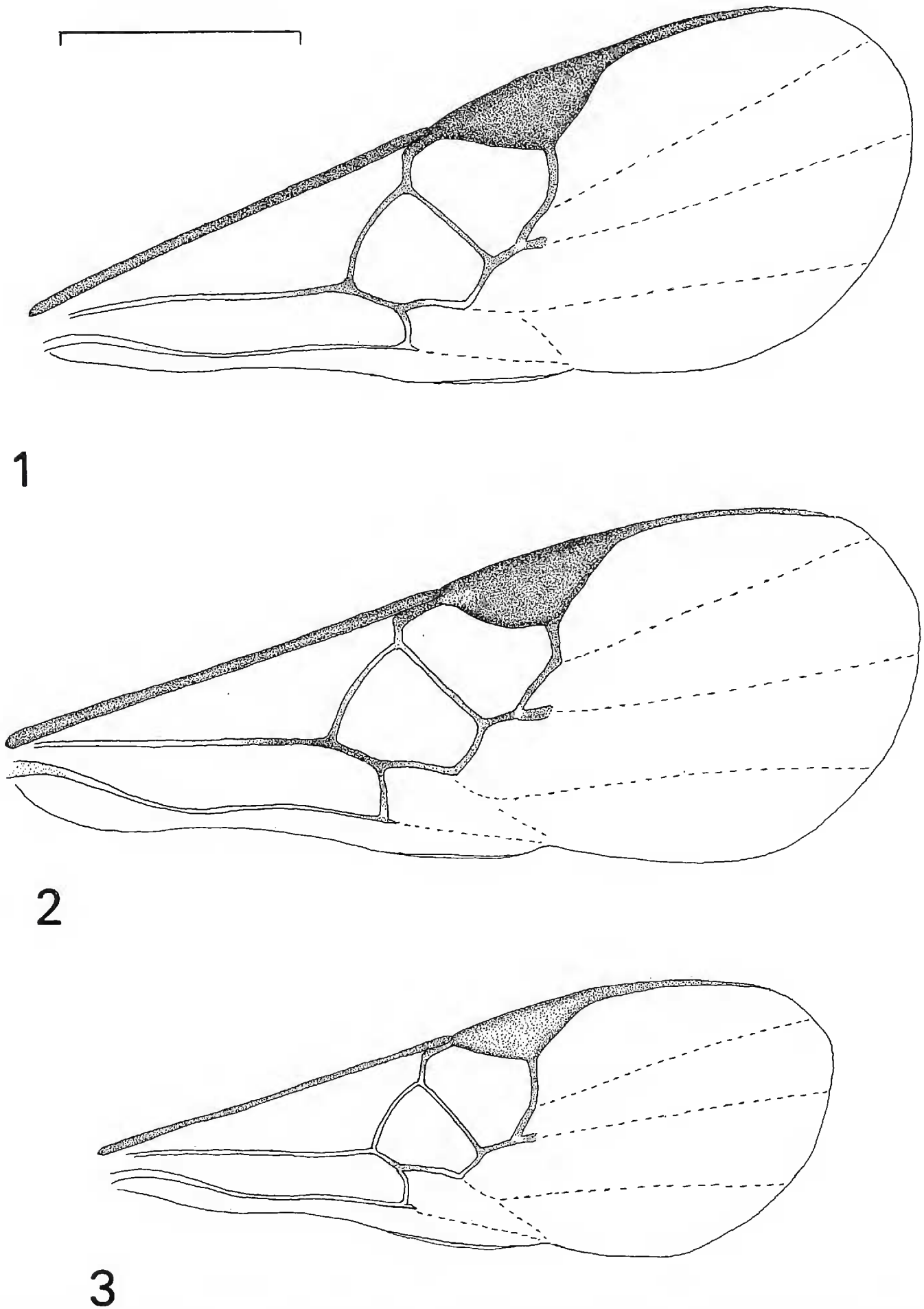
Wings: Tegulae dark brown, weakly translucent. Metacarp (R1) of fore wing virtually same length as stigma; 2r and 1Rs subequal in length and meeting at rounded, approximately 135 degree angle. Pigmentation of fore wing veins yellow-brown proximally, becoming more grey-brown distally.

Metasoma: Tergite I about  $1.2\times$  longer than posterior width, broadening slightly posteriorly, coarsely aciculatorugose, with strong longitudinal groove surrounded by broad depression over basal 0.3. Tergite II quadrate,  $1.6\times$  broader than long, aciculatorugose with stronger overlay of longitudinal sculpturing than in tergite I; medial raised portion indistinct. Tergite III separated from II by crenulate groove, becoming abruptly wider than tergite II but with rounded lateral margins; length somewhat less than that of tergite II; sculptured as in II. Tergite IV short, apically rounded, overlapped by III and with fine, weak longitudinal sculpturing over most of visible surface. Remainder of tergites telescoped under anterior 4 in dried specimens. Hypopygium short, blunt, with sparse long hairs. Ovipositor sheaths short, decurved, subexserted, apically hairy.

*Male*.—Similar to female except antennae longer, apical flagellomeres more slender (flagellomere 14  $2.2\times$  longer than broad), with only apical 4–5 flagellomeres having a single rank of placodes. Venation of fore wing slightly darker.

*Variation*.—Fore wing length 1.6–2.1 mm, with little or no sexual size dimorphism. Coloration comparatively uniform in California material (see Comments below for Eastern specimens).

*Material examined*.—Holotype ♀: CALIFORNIA: Alameda Co., Berkeley Hills, 7-VIII-1981 (J. B. Whitfield), reared ex *Bucculatrix albertiella* cocoons, JBW no. 81H4, emgd. 15–18-VIII-1981. Paratypes: CALIFORNIA: Alameda Co., Berkeley Hills, 1 ♂, 6 ♀, 2-V-1981 (J. B. Whitfield), same host as holotype, emgd. 9–18-V-1981, 1 ♂, 1 ♀, same data except coll. 25-IV-1982, emgd. 20–26-V-1982, 1 ♂, same data except coll. 11-IV-1981, emgd. 8-V-1981. Contra Costa Co., Tilden Regional Pk., 3 ♀, 8 ♂, 28-VIII-1982, emgd. 1–22-IX-1982 (J. B. Whitfield), reared



Figures 1-3. Fore wings of 1, *Deuterixys quercicola*, n. sp.; 2, *D. pacifica*, n. sp.; 3, *D. bennetti*, n. sp. Scale = 0.5 mm.

ex *Bucculatrix albertiella* on *Quercus agrifolia*, JBW no. 82H12. Holotype deposited in USNM; paratypes in USNM, CNC, UCB.

Other material: CALIFORNIA: Alameda Co., Strawberry Cyn., 1 ♂, 1 ♀, 11-IV-1968 (P. A. Opler), reared ex *Bucculatrix* on *Quercus agrifolia*, JAP no. 68D117-8,

7 ♂, 6 ♀, 6-IX-31-X-1975 (D. S. Green), same host. Contra Costa Co., 2 mi E Antioch, 1 ♂, 28-II-1968 (P. A. Opler), reared ex *Bucculatrix* on *Quercus agrifolia*; Briones Regional Pk., 1 ♂, 11-VIII-1981 (J. B. Whitfield). Los Angeles Co., 10 mi N Castiac, 1 ♂, 1 ♀, 26-IV-1977 (D. S. Green), reared ex *Bucculatrix* on *Quercus agrifolia*. Mendocino Co., Univ. Calif. Hopland Field Sta., 880', 1 ♂, 5-V-1968, malaise trap (W. J. Turner). Orange Co., O'Neill Park, 1 ♀, 25-II-1977, reared ex *Aeaea dulcedo* on *Q. agrifolia* (D. S. Green). San Diego Co., 4 mi W Ramona, 1 ♂, 26-II-1977, reared ex *B. albertiella* on *Q. agrifolia* (D. S. Green). San Luis Obispo Co., 9 mi SW Atascadero, 1 ♂, 4-V-1976, reared ex *B. albertiella* on *Q. agrifolia* (D. S. Green). Santa Barbara Co., Santa Cruz Isl. nr. field sta., 1 ♀, 1-V-1976, reared ex *B. albertiella* on *Q. agrifolia* (D. S. Green). Sutter Co., Feather R. at Nicolaus, 1 ♂, 2-X-1982, reared ex *Bucculatrix* sp. on *Quercus lobata*, JBW no. 82K19 (J. B. Whitfield), 1 ♀, 4-X-1982, reared ex *Bucculatrix* sp. on *Artemisia douglasiana*, JAP no. 82K1 (D. L. Wagner). Tulare Co., 3 mi N Kaweah, 1 ♀, 28-IV-1979, reared ex *Bucculatrix* sp. (J. A. Powell).

*Hosts.*—*Bucculatrix albertiella* Bsk. on *Quercus agrifolia* Nee, *Bucculatrix* sp. on *Quercus lobata* Nee and possibly other *Bucculatrix* spp. on oaks. The record from *Aeaea dulcedo* is probably in error and could easily have resulted from unseen *Bucculatrix* contaminants in rearing material. I suspect the record from *Bucculatrix* sp. on *Artemisia douglasiana* Bess. is also mistaken; I know that the specimen from *Bucculatrix* from *Quercus lobata* was taken very nearby and *Bucculatrix* larvae could easily have spun down from the oaks onto the *Artemisia* foliage to pupate. All other *Deuterixys* from *Bucculatrix* on *Artemisia* have been *D. pacifica*, n. sp., described below.

*Comments.*—Several specimens in the USNM collection from Baltimore, Maryland, Washington, D.C. and Tallulah, Louisiana agree with the above description in all features except the metathoracic femora are entirely fulvous and veins 1Cu1 and 2Cu1 of the fore wing are less strongly pigmented than in the California material. The specimens tend to be slightly smaller as well, but I have seen only 4 eastern U.S. individuals. I provisionally include these as *D. quercicola*, but more material, including rearing records for the eastern forms, is necessary for a more certain determination. It is certainly possible that *D. quercicola* appears widely throughout the range of oak-feeding *Bucculatrix*.

This species can be distinguished from *D. carbonaria* (Wesm.) and *D. nixonii* (Papp), its most similar Palearctic relatives, by its possession of the following combination of features: 1) posteriorly broadening metasomal tergite I; 2) metasomal tergite IV with fine longitudinal sculpturing over most of its surface; 3) tergite IV usually concealing successive terga in dorsal view; 4) propodeum with strong medial longitudinal carina and 5) hind coxae dark brown. The resemblance to *D. nixonii* is striking; it is possible the two may eventually prove to be synonymous.

### *Deuterixys pacifica* Whitfield, NEW SPECIES

(Figs. 2, 5)

*Holotype female.*—Overall length 1.6 mm, fore wing length 1.7 mm.

Head: Antennae approximately same length as body, nearly black throughout, apical 9 flagellomeres with only one rank of placodes; 2nd flagellomere 3.0× longer than wide; flagellomere 14 1.3× longer than wide. Frons 1.4× broader at

midheight than long down middle; inner margins of eyes weakly converging towards clypeus. Punctuation of frons, vertex and postgenae indistinct; microsculpture producing dull metallic reflections in diffused light.

Mesosoma: Mesoscutum shallowly punctate anteriorly, becoming less distinctly and more sparsely punctate posteriorly. Scutellar disc distinctly punctate, duller between punctures than mesoscutum, strongly convex posteriorly. Propodeum highly polished, virtually unsculptured except for strong medial longitudinal carina; weakly convex in profile.

Legs: Prothoracic legs basally dark brown to black up to distal 0.5 of femur, lighter fulvous beyond this point. Mesothoracic legs dark brown to black except distal 0.2 of femur and proximal 0.6 of tibia, which are fulvous. Metathoracic legs very dark brown to black except yellowish proximal 0.6 of tibia. Apical spurs of hind tibiae short, whitish, subequal in length.

Wings: Tegulae dark brown, weakly translucent. Metacarp (R1) of fore wing slightly shorter than stigma. 2r and 1Rs virtually straight, subequal in length, meeting at about 130 degree angle. Venation including stigma mainly deep brown; M+Cu and 1A+2A weakly pigmented proximally.

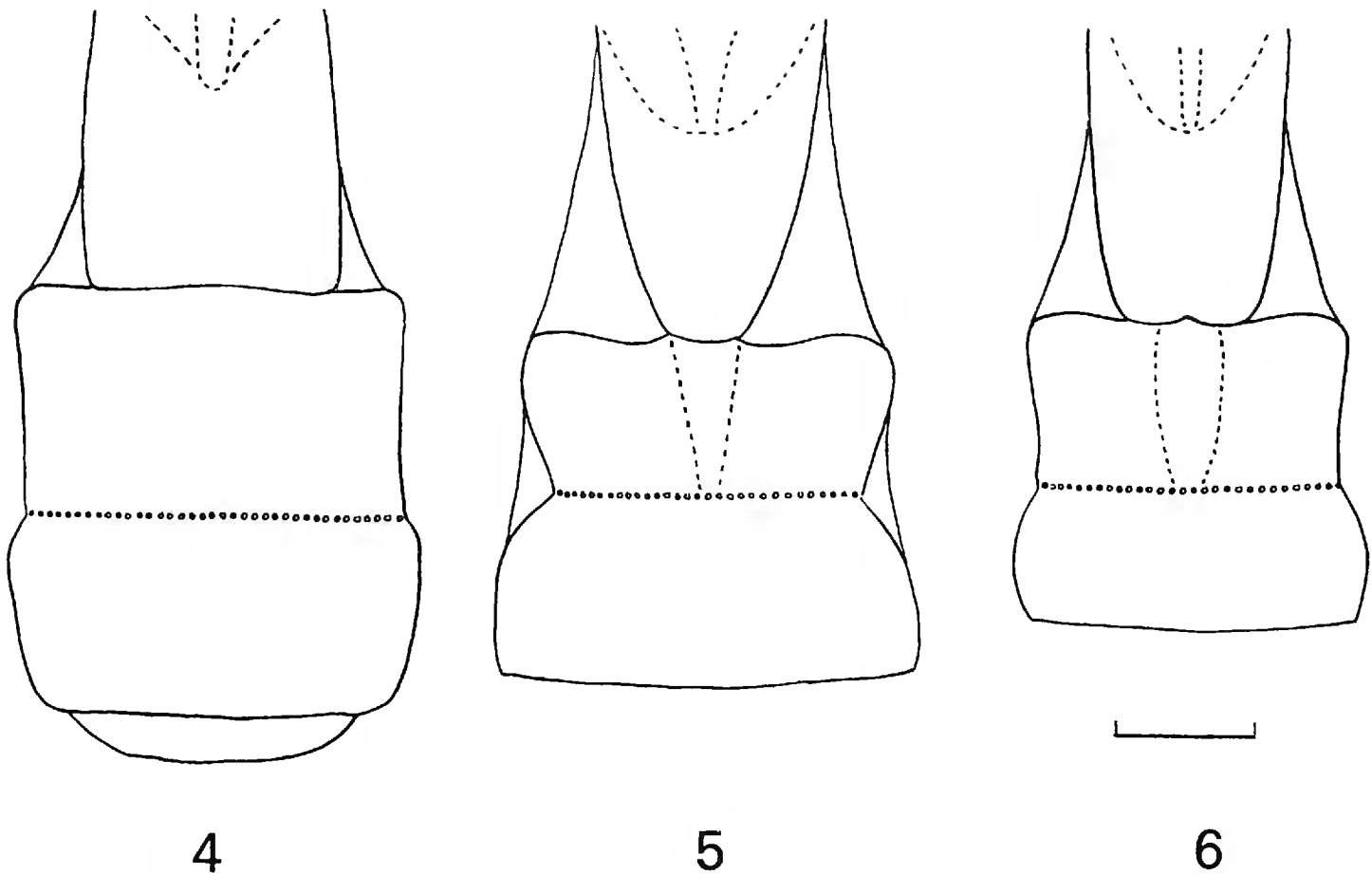
Metasoma: Tergite I strongly narrowing posteriorly, approximately  $2.5 \times$  broader anteriorly than posteriorly, with strong medial longitudinal groove over basal 0.4–0.5; longitudinally rugose/carinate over posterior 0.7. Tergite II  $2.3 \times$  broader anteriorly than long down middle, lateral margins converging noticeably posteriorly; surface longitudinally aciculatorugose. Tergite III separated from II by weak crenulate furrow, abruptly widening, becoming broader posteriorly than tergite II at broadest point; surface with fine longitudinal sculpturing mediobasally, otherwise very weakly if at all sculptured. Laterotergites dark yellow-brown. Succeeding terga of usual unsculptured, overlapping type. Hypopygium short, blunt apically, somewhat truncate at tip, with sparse long hairs. Ovipositor sheaths short, subexserted, decurved, polished, with hairs concentrated apically.

*Male*.—Similar to female except antennae clearly longer than body, with all but apical 4–5 flagellomeres with 2 ranks of placodes. Length/width ratio of flagellomere 14 = 2.3 (other apical flagellomeres also more elongate than in female).

*Variation*.—Fore wing length 1.6–2.0 mm. No apparent sexual size dimorphism. Coloration comparatively uniform except some darker high elevation individuals, which also tend to have smoother metasomal sculpturing. A few specimens have the first metasomal tergite less strongly narrowed than in the type series.

*Material examined*.—Holotype ♀: CALIFORNIA: Contra Costa Co., Tilden Regional Pk., 15-VIII-1982 (J. B. Whitfield). Paratypes: CALIFORNIA: Contra Costa Co., Tilden Regional Pk., 6 ♀, 13 ♂, 15-VIII-1982 (J. B. Whitfield), 8 ♀, 6 ♂, 29-VIII-1982 (JBW), 8 ♀, 2 ♂, 25-IV-1983 (JBW); Chabot Regional Pk., 3 mi N Lake Chabot, 1 ♂, 12-VII-1980 (JBW); nr. Clayton, 1 ♀, 27-II-1982, reared ex *Bucculatrix*, JAP no. 82B29, emgd. 21-III-1982 (D. L. Wagner). Alameda Co., Berkeley, 11 ♀, 6 ♂, 10-IV-1983, reared ex *Bucculatrix* on *Baccharis pilularis*, JBW no. 83D19 (J. B. Whitfield). Holotype deposited in USNM; paratypes in USNM, CNC, UCB.

Other material: CALIFORNIA: Alameda Co., Berkeley Hills, 2 ♂, 6/7-VIII-1982 (J. B. Whitfield); Patterson Reserve, Del Valle Lake, 1 ♂, 29-IV-1974, reared ex microlepidoptera, JAP no. 74D40-41 (J. A. Powell). Contra Costa Co., Pt. Molate, Richmond, 1 ♂, XI-1969, reared ex *Iva axillaris*, JAP no. 69L9. El Dorado Co., Fallen Leaf Lake, 1 ♀, 9-VII-1983, reared ex *Bucculatrix* on *Artemisia tri-*



Figures 4–6. Basal tergites of 4, *Deuterixys quercicola*, n. sp.; 5, *D. pacifica*, n. sp.; 6, *D. bennetti*, n. sp. Scale = 0.1 mm.

*dentata*, JBW no. 83G67 (J. B. Whitfield). Riverside Co., Thousand Palms, 1 ♂, 27-IV-1955 (W. R. Richards); Palm Springs, 1 ♀, 3-V-1955 (W. R. M. Mason). San Luis Obispo Co., Oso Flaco Lake, 2 ♀, 13-VII-1959 (C. A. Campbell). San Mateo Co., San Bruno Mts., 1 ♂, 12-III-1982 (J. B. Whitfield), 2 ♀, 21-IV-1983, reared ex *Bucculatrix* on *Baccharis pilularis*, JADeB. no. 83111-E (J. A. DeBenedictis), 1 ♀, 15-VI-1982, reared ex *Bucculatrix* on *Baccharis pilularis* (D. L. Wagner). Ventura Co., San Nicolas Isl., 1 mi SSE 1000 Springs, 1 ♀, 6–8-VI-1980 (S. E. Miller, P. M. Mercer). NEW MEXICO: Springer, 1 ♂ (no date) (C. N. Ainslee). UTAH: Guardsman Pass, nr. Brighton, 1 ♂, 10-VII-1981, 9800' (B. H. Poole). BRITISH COLUMBIA: Robson, 1 ♀, 13-V-1947 (H. R. Foxlee).

*Hosts.*—*Bucculatrix variabilis* Braun and *Bucculatrix separabilis* Braun on *Baccharis pilularis* DC, *Bucculatrix* sp. on *Artemisia douglasiana* Bess., *Bucculatrix* sp. on *Artemisia tridentata* Nutt. and *Bucculatrix* sp. on *Iva axillaris* Pursh. I suspect a wide range of *Bucculatrix* spp. on Compositae serve as hosts.

*Comments.*—No other known species of *Deuterixys* has the first metasomal tergite so strongly narrowed apically. The relative lack of sculpturing on the third tergite is also distinctive among the Nearctic species, although this feature is shared with the Palearctic *D. rimulosa* (Niez.). The species appears to be widespread in Western North America, probably in part due to the broad range of *Artemisia tridentata*.

***Deuterixys bennetti* Whitfield, NEW SPECIES**  
(Figs. 3, 6)

*Holotype female.*—Overall length 1.6 mm, fore wing length 1.7 mm.

Head: Antennae approximately 1.1–1.2 × longer than body; scapes and pedicels

light yellow-brown, more distal portions of antennae dark brown; apical 9 flagellomeres with only one row of placodes; 2nd flagellomere  $3.8\times$  longer than broad; 14th flagellomere  $1.2\times$  longer than broad. Frons  $1.3\times$  broader at midheight than long down middle; inner margins of eyes weakly converging towards clypeus. Punctuation of frons, vertex and postgenae faint; microsculpture producing dull metallic reflections in diffused light.

Mesosoma: Mesoscutum shallowly punctate anteriorly, becoming nearly impunctate posteriorly. Scutellar disc sparsely, shallowly punctate throughout, evenly convex. Propodeum highly polished, virtually without sculpturing except for strong medial longitudinal carina and weak transverse ridging in immediate vicinity of longitudinal carina and lateral margins; propodeum strongly convex anteriorly in profile.

Legs: Prothoracic legs fulvous virtually throughout except slightly darker apical tarsomeres. Mesothoracic legs fulvous virtually throughout except infuscate distal half of tibiae and apical tarsomeres. Metathoracic legs with darkened coxal bases, apical third of femora, apical two-thirds of tibiae and entire tarsi; remainder of hind legs lighter yellow-brown. Hind tibial spurs whitish, subequal in length,  $0.4\times$  as long as hind basitarsi.

Wings: Tegulae pale yellowish. Metacarp (R1)  $1.2-1.3\times$  length of stigma; 2r and 1Rs subequal, 2r very faintly arched, the two veins meeting at a 145 degree angle. Venation of fore wing, including stigma, translucent pale yellow-brown.

Metasoma: Tergite I weakly narrowing posteriorly,  $2\times$  longer than broad at midlength, with strong medial longitudinal groove over anterior 0.4; coarsely aciculatorugose over most of surface. Tergite II strongly quadrate, slightly broader anteriorly than posteriorly,  $1.8\times$  broader anteriorly than long down middle; surface coarsely aciculatorugose throughout. Tergite III separated from II by strong crenulate furrow, wider than II, abruptly widening over anterior 0.4, then parallel-sided;  $2.2\times$  broader posteriorly than long down middle; surface coarsely, longitudinally carinulate over most of surface. Succeeding terga virtually sculptureless, normally overlapping. Laterotergites translucent orange-brown. Hypopygium short, blunt but not truncated apically, sparsely clothed with long hairs. Ovipositor sheaths short, subexserted, decurved, polished, with hairs concentrated apically.

*Male*.—Similar to female except antennae longer, more slender (14th flagellomere  $2.2\times$  longer than broad), with single placode bands only on apical 4; antennae generally somewhat lighter brown. Hind legs mostly evenly darker fulvous than in female with nearly black coxae and lighter proximal portions of tibiae.

*Variation*.—Fore wing length 1.7–1.9 mm. No apparent sexual size dimorphism. Coloration rather uniform in limited series available; some specimens in poor condition and somewhat bleached. Some variation exists in the number of spines on the outer faces of the hind tibiae.

*Material examined*.—Holotype ♀: FLORIDA: Nassau Co., O'Neil, V-1960, reared from *Bucculatrix* on *Baccharis halimifolia* (F. D. Bennett). Paratypes: FLORIDA: Nassau Co., 2 ♀, 3 ♂, V-1960, same host (F. D. Bennett); Brevard Co., Melbourne Beach, 2 ♀, 1 ♂, V-1960, same host (F. D. Bennett); Walkulla Co., Medart, 1 ♀, V-1960, same host (F. D. Bennett); St. Johns Co., St. Augustine, 1 ♀, V-1960, same host (F. D. Bennett); Pinellas Co., St. Petersburg, 1 ♀, V-1960, same host (F. D. Bennett), 3 ♀, X-1960, same host (F. D. Bennett); Pasco Co., Elfers, 1 ♂, 16-IV-1960 (O. Peck). Holotype deposited in USNM, paratypes in USNM, CNC collections.

*Hosts.*—The only recorded host is *Bucculatrix* sp. on *Baccharis halimifolia* L. It is likely that other *Bucculatrix* spp. feeding on shrubby composites in the Southeast may also serve as hosts.

*Comments.*—The species is named after F. D. Bennett, the collector of most of the type series. *D. bennetti* strongly resembles the Palearctic *D. rimulosa* (Niez.) (= *D. comes* (Wilk.) according to Papp, 1971), but differs in the much longer metacarp and the more strongly sculptured third metasomal tergite.

#### KEY TO NEARCTIC SPECIES OF *DEUTERIXYS* MASON

1. First tergite of metasoma narrowed posteriorly ..... 2  
    First tergite broadened posteriorly ..... *D. quercicola*, n. sp.
2. Tegulae pale yellow-brown; third metasomal tergite distinctly sculptured  
    over most of its surface ..... *D. bennetti*, n. sp.  
    Tegulae dark brown; third tergite at most only weakly sculptured antero-  
    medially ..... *D. pacifica*, n. sp.

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#### LITERATURE CITED

- Mason, W. R. M. 1981. The polyphyletic nature of *Apanteles* Foerster (Hymenoptera: Braconidae): a phylogeny and reclassification of Microgastrinae. Mem. Ent. Soc. Can., 115, 147 pp.
- Nixon, G. E. J. 1965. A reclassification of the tribe Microgasterini (Hymenoptera: Braconidae). Bull. Brit. Mus. (Nat. Hist.) Ent. Suppl., 2, 284 pp.
- . 1976. A revision of the north-western European species of the *merula*, *lacteus*, *vipio*, *ultor*, *ater*, *butalidis*, *popularis*, *carbonarius* and *validus*-groups of *Apanteles* Förster (Hymenoptera: Braconidae). Bull. Ent. Res., 65:685–732.
- Papp, J. 1971. Ergebnisse der zoologische Forschungen von Z. Kaszab in der Mongolei, 265. Braconidae (Hymenoptera) III. Ann. Hist.-Nat. Mus. Nat. Hung. (Budapest), 63:307–363.